

REMARKS

In the Specification:

The specification has been amended to include the status of the parent application as suggested by the Examiner.

The Examiner has stated that a new title is required that is clearly indicative of the invention to which the claims are directed.

The title has been amended to clearly indicate the invention to which the claims are directed.

Claims 14 and 15:

Claims 14 and 15 have been rejected under 35 USC 112, second paragraph. Claims 14 and 15 have been amended in a manner believed to obviate the rejection under 35 USC 112, second paragraph.

Accordingly, withdrawal of the rejection is respectfully requested.

Claims 2, 18, and 19:

Claims 2, 18, and 19 have been rejected under 35 USC 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA), in view of Wei et al. (US6614677).

With respect to independent Claims 2 and 18, the Examiner has relied on AAPA in combination with Wei to make a prior art showing of applicants' claimed techniques.

The Examiner is reminded that the analysis of obviousness was set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

First, there must be some *suggestion or motivation*, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of the references. Second, there must be a *reasonable expectation of success*. Finally, the prior art reference or combined references must teach or suggest *all the claim limitations*. *The teaching*

or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991; emphasis added).

Applicants respectfully traverse the rejection as failing the *Graham* test. Specifically, the combination proposed in the rejection fails at least the first element of the *Graham* test.

With respect to the first element, the Examiner has stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of AAPA by including the patterning process of Wei to perform an art recognized equivalent process of filling a channel with conductive material to provide a patterned conductive material.

Applicants respectfully disagree and assert that, in Col. 3, lines 26-29, Wei discloses that a "...layer 66 of PMGI...is deposited on write gap layer 16" and is "...a key feature of the invention..." (emphasis added). Thus, the rejection proposed would require an additional processing step in the AAPA in order to incorporate Wei's required PMGI layer, changing the principle of operation of AAPA. Therefore, the rejection proposed requires an impermissible change in the principle of operation of AAPA.

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

In addition, it cannot be said that the references would suggest the invention as a whole to those of ordinary skill at the time the invention was made, particularly where the invention requires depositing a silicon dielectric layer on the photoresist layer; masking the silicon dielectric layer; and etching at least one channel in the photoresist layer and the silicon dielectric layer. Any assertion that the references suggest a process of manufacturing having all of the claim limitations would be predicated on impermissible hindsight reconstruction based on applicants' disclosure. The patent

examination rules require that the content of the prior art is determined at the time the invention was made. The requirement “at the time the invention was made” is to avoid impermissible hindsight. Consider the following quote:

“It is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

In the instant case, those skilled in the art at the time the present invention was made did not recognize the importance of depositing a silicon dielectric layer on the photoresist layer; masking the silicon dielectric layer; and etching at least one channel in the photoresist layer and the silicon dielectric layer, as required by the present invention. It was this insight that helped the inventors conceive of the claimed invention which overcomes the drawbacks of the prior art. “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” *Schenck v. Nortron Corp.*, 713 F.2d at 785, 218 USPQ at 700 (citations omitted).

As evidence that applicants’ insight was contrary to the understandings and expectations of the art, the Examiner is directed to AAPA, which is devoid of any silicon dielectric layer on the photoresist layer, and which reflects the standard methodology of the day.

As further evidence that applicants’ insight was contrary to the understandings and expectations of the art, the Examiner is directed to Wei, which discloses a required PMGI layer that is used during a liftoff process wherein an etch mask is made up of an upper layer of conventional photoresist and a lower layer of PMGI (see Col. 3, lines 26-36). Applicants have no such requirement for a PMGI layer, a “key feature” in Wei. Thus, applicants do not require the additional step of “depositing a layer of PMGI” as

claimed by Wei, and therefore eliminate any additional inherent procedural problems resulting from the addition of a PMGI layer.

Accordingly, per the rule of *Schenck, supra*, because applicants' insight was contrary to the understandings and expectations of the art, the claimed structure effectuating it would not have been obvious to those skilled in the art.

Therefore, because the *Graham* test is not met, allowance of Claims 2 and 18 is respectfully requested.

Claim 19 depends from Claim 18, and therefore incorporates the limitations of Claim 18. Accordingly, Claim 19 is also believed to be allowable over AAPA and Wei.

Claims 1, 3-6, and 10-17:

Claims 1, 3-6, and 10-17 have been rejected under 35 USC 103(a) as being unpatentable over the combination of Applicant Admitted Prior Art (AAPA), Wei et al., and Sasaki (US6195872).

With respect to independent Claim 1, the Examiner has relied on AAPA in combination with Wei and Sasaki to make a prior art showing of applicants' claimed techniques.

The Examiner is reminded that the analysis of obviousness was set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

First, there must be some *suggestion or motivation*, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of the references. Second, there must be a *reasonable expectation of success*. Finally, the prior art reference or combined references must teach or suggest *all the claim limitations*. *The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art*, and not based on applicant's disclosure (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991; emphasis added).

Applicants respectfully traverse the rejection as failing the *Graham* test. Specifically, the combination proposed in the rejection fails the first, and third elements of the *Graham* test.

With respect to the third element, the Examiner has relied on item 38 of Figure 13A from Sasaki to make a prior art showing of applicants claimed technique “wherein an aspect ratio of the at least one channel is at least about 7.”

As is well known, an aspect ratio is the ratio of height to width. Applicants respectfully assert that item 38 of Figure 13A from Sasaki merely shows a cross section of coil-shaped recesses having a depth of 2.5-3 μm , a width of 1.5-2.5 μm , and a spacing of 0.3-0.5 μm (see Col. 7, lines 48-50). Thus, the maximum aspect ratio of Sasaki’s coil-shaped recess is 2, clearly illustrating that Sasaki fails to meet applicants’ claimed technique “wherein an aspect ratio of the at least one channel is at least about 7” (emphasis added).

Further, with respect to the third element, the Examiner has stated that the AAPA inherently meets applicants’ claimed technique “wherein a grain size of the conductive material is less than half of a smallest dimension of the at least one channel.”

In response, applicants assert that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

In addition, the Examiner has argued that “one molecule of the conductive material of the AAPA would be less than half of a smallest dimension of the at least one channel” (emphasis added). Applicants respectfully assert that applicants claim a

technique “wherein a grain size of the conductive material is less than half of a smallest dimension of the at least one channel” (emphasis added), rather than a molecule.

Applicants assert that the above claim language is to be read according to the plain and ordinary meaning thereof. As evidence of the plain meaning of the term grain, its dictionary definition is set forth below:

Main Entry: grain

Pronunciation: 'grAn

Function: *noun*

2 a (3) : an individual crystal in a metal

"grain." *Merriam-Webster Online Dictionary*. 2006-2007. <http://www.merriam-webster.com> (12 Jan. 2006).

Accordingly, it cannot be said that the prior art teaches or suggests the combination of features proposed in the rejection, as required by the *Graham* test.

With respect to the first element, the Examiner has stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of AAPA by including the patterning process of Wei to perform an art recognized equivalent process of filling a channel with conductive material to provide a patterned conductive material.

Applicants respectfully disagree and assert that, in Col. 3, lines 26-29, Wei discloses that a “...layer 66 of PMGI...is deposited on write gap layer 16” and is “...a key feature of the invention...” (emphasis added). Thus, the rejection proposed would require an additional processing step in the AAPA in order to incorporate Wei’s required PMGI layer, changing the principle of operation of AAPA. Therefore, the rejection proposed requires an impermissible change in the principle of operation of AAPA.

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the

references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

In addition, it cannot be said that the references would suggest the invention as a whole to those of ordinary skill at the time the invention was made, particularly where the invention requires depositing a silicon dielectric layer on the photoresist layer; masking the silicon dielectric layer; and etching at least one channel in the photoresist layer and the silicon dielectric layer. Any assertion that the references suggest a process of manufacturing having all of the claim limitations would be predicated on impermissible hindsight reconstruction based on applicants' disclosure. The patent examination rules require that the content of the prior art is determined at the time the invention was made. The requirement "at the time the invention was made" is to avoid impermissible hindsight. Consider the following quote:

"It is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

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As evidence that applicants' insight was contrary to the understandings and expectations of the art, the Examiner is directed to AAPA, which is devoid of any

silicon dielectric layer on the photoresist layer, and which reflects the standard methodology of the day.

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Accordingly, per the rule of *Schenck, supra*, because applicants' insight was contrary to the understandings and expectations of the art, the claimed structure effectuating it would not have been obvious to those skilled in the art.

Accordingly, it cannot be said that either reference teaches or suggests the combination of features proposed in the rejection, as required by the *Graham* test.

Therefore, because the *Graham* test is not met, allowance of Claim 1 is respectfully requested.

With respect to Claim 14, the Examiner has relied on item 38 of Figure 13A from Sasaki to make a prior art showing of applicants claimed technique "wherein an aspect ratio of the at least one channel is at least 7."

As is well known, an aspect ratio is the ratio of height to width. Applicants respectfully assert that item 38 of Figure 13A from Sasaki merely shows a cross section of coil-shaped recesses having a depth of 2.5-3 μm , a width of 1.5-2.5 μm , and a spacing of 0.3-0.5 μm (see Col. 7, line 48-50). Thus, the maximum aspect ratio of Sasaki's coil-shaped recess is 2, clearly illustrating that Sasaki fails to meet applicants' claimed technique "wherein an aspect ratio of the at least one channel is at least about 7."

Accordingly, it cannot be said that the prior art teaches or suggests the combination of features proposed in the rejection, as required by the *Graham* test.

Therefore, because the *Graham* test is not met, allowance of Claim 14 is respectfully requested.

With respect to Claim 15, the Examiner has stated that the AAPA inherently meets applicants' claimed technique "wherein a grain size of the conductive material is less than half of a smallest dimension of the at least one channel."

In response, applicants assert that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

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Applicants assert that the above claim language is to be read according to the plain and ordinary meaning thereof. As evidence of the plain meaning of the term grain, its dictionary definition is set forth below:

Main Entry: grain

Pronunciation: 'grAn

Function: *noun*

2 a (3) : an individual crystal in a metal

"grain." *Merriam-Webster Online Dictionary*. 2006-2007. <http://www.merriam-webster.com> (12 Jan. 2006).

Accordingly, it cannot be said that the prior art teaches or suggests the combination of features proposed in the rejection, as required by the *Graham* test.

Therefore, because the *Graham* test is not met, allowance of Claim 15 is respectfully requested.

Claims 3-6, 10-13, and 17 depend from Claim 1, and therefore incorporate the limitations of Claim 1. Accordingly, Claims 3-6, 10-13, and 17 are also believed to be allowable over the combination of AAPA, Wei, and Sasaki.

Should the Examiner wish to discuss this matter further, the Examiner is invited to call the undersigned at (408) 971-2573. For payment of any fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-2587 (Order No. SJ0920010089US3).

Respectfully submitted,

By: /Dominic M. Kotab/ Date: January 16, 2007
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